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tity of cyanide of potassium invariably produced during the process of preparing potassium, admits of a similar explanation.

I am, Gentlemen, &c. &c.

*Old Barge House,  
Lambeth.*

LEWIS THOMPSON.

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No. II.

PURIFICATION OF COPPER.

*The GOLD MEDAL was presented to Mr. LEWIS THOMPSON, Old Barge House, Lambeth, for his Method of purifying Copper. The following Communication has been received from him on the Subject.*

THE art of manufacturing copper appears to have been known from the most remote antiquity: indeed, judging from the purity of the coins and warlike instruments which have descended to us, we might at first suppose that this, like some other of the arts formerly in use, had been partially lost, and that the ancients were better acquainted with the mode of making pure copper than we are at the present day. The great purity of their cupreous alloys is, however, much better accounted for, by attributing it to the richness of the ores then in use: for, in all probability, they were unable to extract copper from such poor pyritic ore as is now employed for that purpose, and from which English commercial copper is obtained, in a state of sufficient purity for the ordinary purposes to which copper is applied. It is always, how-

ever, contaminated with the foreign matters existing in the ore: these are chiefly iron, lead, arsenic, sulphur, and antimony; carbon, too, is occasionally imparted during the process of reduction. These impurities vary from two to seven per cent, and greatly impair the ductility and malleability of the metal. With one-half per cent of arsenic, sulphur, or antimony, copper is decidedly brittle under the hammer, and with one per cent this effect becomes very obvious. Lead and iron have a less injurious effect; but in the proportion of two per cent, they materially affect the colour and texture, and the alloy has a harsh, dull, and mottled appearance when polished. With a very small quantity of carbon, copper is brittle, and has a gray, uneven fracture.

The Swedish copper being almost free from these impurities has long been held in high estimation, not only in this country, but also on the Continent, where the finer kinds of brass are made almost solely with it, to the exclusion of the English copper; a cheap and effectual mode of removing the impurities from which has long been a desideratum. The following method will be found to answer that purpose, and its simplicity is such as to require no particular care or management on the part of the workmen:—

Take of impure copper .....	100 parts;
Copper scales.....	10 parts;
Ground bottle glass, or any other flux .....	10 parts;

heat the whole together in a covered crucible, and keep the copper in a state of fusion for twenty minutes or half an hour, at the end of which time it will be found at the bottom of the crucible perfectly pure. The quantity

of copper scales must vary in proportion to the supposed impurity of the copper to be operated on ; but the proportions here given will be found to answer very well for the average kind of English copper. The explanation of this process is sufficiently simple ; the impurities contained in the copper, consisting, as we have seen, of iron, lead, arsenic, &c. combine with the oxygen contained in the copper scales, and form oxides or acids, which are dissolved by the flux, or fly off in a gaseous form, leaving the purified copper, together with that reduced from the scales, at the bottom of the crucible ; consequently, the copper obtained exceeds that put into the crucible, the gain generally averaging from one to one and a half per cent. In this way I have obtained perfectly pure copper from brass, bell-metal, gun-metal, and several other alloys containing from four up to fifty per cent of iron, lead, antimony, tin, bismuth, arsenic, &c.

In my earlier experiments, I made use of the oxide of copper obtained from the acetate or sulphate, and proposed in practice to employ some of the native oxides of sufficient purity, such as the malachites. Mr. Aikin, however, has since kindly pointed out to me the scales of copper, as the cheapest and most abundant source for obtaining the oxide, since they are produced in large quantities at every copper manufactory. I have repeated nearly the whole of my experiments with them without observing any variation in the result, as might, indeed, have been anticipated.

I am, Gentlemen, &c. &c.

*Old Barge House,  
Lambeth.*

LEWIS THOMPSON.